

Robust usage of visual information in Multi-Modal SLAM

Abstract: Robustness of state estimation to perceptual degradations can be tackled by utilization of data from multiple different sensors that have complimentary failure scenarios. Factor graphs allow for an intuitive representation for combining information from these sensors as factors and formulate the estimation as an optimization problem. Optimizing the constraints introduced by the sensors directly in a tightly-coupled manner instead of using the result of separate pipelines (loose-coupling) can allow for better detection and handling of degradations in the overall system. Taking LiDAR, Camera and IMU as the sensors available onboard a micro aerial vehicle, this project will investigate the robust usage of visual information for combination with LiDAR and IMU data to build a robust Multi-Modal SLAM method.

Tasks:

- Study and understand multi view geometry, visual(/-inertial) odometry and SLAM, factor graphs and multi-modal SLAM.
- Develop factors for usage of visual information
- Investigate possibilities for combined factors utilizing visual and LiDAR information
- Deployment of the system on a real robot

Literature (indicative):

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Relevant Project Information

- **SENTIENT Project - Funding Agency:** Research Council of Norway

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